presenting the various weights in tons, as shown. It will be noticed that the lettering of the panels, and the naming of a member by the letters on either side simplifies the process throughout.

From	R	and	S	draw	Ra, Sa,	parallel to	Ra′	and	Sa′	on	sketch	until	they	intersect at a
"	a′	"	S	"	ab, Sb	"	a′b′	"	Sb′	"	"	"	"	b
"	Q	"	b	"	Qd, bd	"	Qd′	"	b′d′	"	"	"	"	d
"	S	"	d	"	Se, de	"	Se′	"	d′e′	"	"	"	"	e
"	O	"	e	"	Og, eg	"	Og′	"	e′g′	"	"	"	"	g
"	S	"	g	"	Sh, gh	"	Sh′	"	g′h′	"	"	"	"	h
"	N	"	h	"	Nj, hj	"	Nj′	"	h′j′	"	"	"	"	j
"	S	"	j	"	Sk, jk	"	Sk′	"	j′k′	"	"	"	"	k
"	M	"	K	"	ML, KL	"	ML′	"	K′L′	"	"	"	"	L
"	S	"	L	"	ST, LT	"	ST′	"	L′T′	"	"	"	"	T

S′ represents the curved tie in each panel. The stress on each member in the truss is represented by the line parallel to it in the diagram, i.e., stress in K′L′ equals 9 tons and in M′L′ equals 17¾ tons, etc.

The check on the diagram can be seen at once, as the lines TL and TS representing the tension on the vertical and horizontal members at centre will also be vertical and horizontal respectively. These stresses can also be calculated mathematically as a further check.

The accompanying table shows the actual sectional area required for the various members.

Table Showing Sectional Areas and Scantling.

	Principal and bottom curved tie									Bracings									
Scantling	Ra′	Qd′	Og′	Nj′	ML′	bs′	e′s′	h′s′	K′s′	Sa′	a′b′	b′d′	d′e′	e′g′	g′h′	h′j′	j′K′	K′L′	L′T′	T′S′
Stress in tons	10½	28¾	34	27¼	17¾	16	29¾	29¼	22	9½	13	12¼	5½	2½	4½	5¼	9	9	8	15½
Net area required	1.8	4.8	5.7	4.5	3.0	1.7	5.0	5.0	3.7	1.6	2.2	2.0	0.9	0.4	0.8	0.9	1.5	1.5	1.3	2.6
Gross area required	No. 2 7/8" rivets area = 1.20 + 5.7 = **6.9 gross**									No. 2 rivets = 1.20 + 2 + 2 = **3.4 gross area**										
Bars at centre	No. 2 7/8" rivets area = 1.20 + 1.3 (L′T′) = **2.5** against No. 2 vertical bars at centre = 2 × 3 × ½ = **3.0**																			
Principals, &c.	No. 2 L.I.S. 5" × 3" × ½" = 2 (5 + 2½) × ½ = **7.5 sq. ins.**—No. 2 L.I.S. 3 × 2 × ½ = 2 (3 + 1½) × ½ = **4.5 sq. ins.**																			

The stress allowed in this case is 6 tons per sq. in. It will be noticed that stress on the different panels for the principal and curved or main tie naturally changes at each end, and also for the bracing, and that, for economy as well as simplicity in construction, it is always best to have one sectional area only. Consequently the greatest stress in each case is taken, i.e., for the principal and curved tie 34 tons is taken, and for the bracing 13 tons. This becomes 5.7 and 2.2 sq. in. respectively when worked out, and, adding in each case 2 holes of ⅞ in. diameter, the final results amount to 6.9 and 3.4 sq. in. gross area respectively. It will be seen that the principals and curved ties composed of No. 2 L.S. 5 in. by 3 in. by ½ in. gives 7.5 sq. in., against 6.9, and that the bracing composed of No. 2 L.S. 3 in. by 2 in by ½ in. equals 4.5 sq. in., against 3.4. At the centre of truss L′T′ has a tension of 1.3 tons and for two rivet holes 1.20, so that the total amounts to 2.5 sq. in., and No. 2 vertical tension bars having 3.0 sq. in. will be about right. The rivets should never be less than ⅞ in. for this span of 60 ft., although ¾ in. diameter rivets are sometimes used, but then more rivets are needed at the joints, and consequently the plates are much larger and therefore clumsy. In work of this kind it is not always wise to consider the rivets in double shear where this occurs, as practically no rivet is ever sheared in two places at once. It must be remembered that at the joints there must be enough rivets in the end of each bracing or tie to take the thrust or pull in either case. The pitch of rivets for the principals and curved or main tie equals 3½ ins., and for the bracing 2⅝ ins. The holes for rivets are generally made ⅛ in. larger in diameter than the rivets.

The plates at joints are ½ in. in thickness. In no cases should they be less than ⅜ in., otherwise they are liable to cut through the rivets. Cutting the plates to the shape shown makes a far neater job, makes the truss lighter, and looks more workmanlike. The larger rivet of ⅞ in. makes a better "snap," and each head has a better grip, which makes the structure more rigid and less likely to wear lose, and consequently makes the truss more durable. The bracings should be neatly chamfered at the ends, so that the flats can fit properly together, and have a good bearing with the plates. The riveting should be carefully done so as to fill the holes, otherwise they are not reliable. In heavy work extra rivets are put in to allow for defective work, especially in girder work. This work was made extra stiff to allow for vibrations which would be caused by the trapeze which were slung from the main ties by rings fixed for that purpose.

Lastly, one of the main points to be observed in constructing the stress diagram is to work from the eaves, and to have three forces complete at each step.

A new hard alloy of platinum has been produced by Dr. Fritz Zimmerman, of Newark, N.J., by the addition of osmium. It is claimed that this alloy, containing from one-half to 10 per cent. of osmium, having physical and electrical properties fully equal to the platinum alloy containing a much higher percentage of iridium.

September 22nd, 23rd and 24th are the days of the annual meeting of the American Mine Safety Association, the membership of which is composed of coal and metal mine operators, mining engineers, etc., and having for its object the reduction of the number of accidents in mines and quarries. The Convention will be held in Pittsburg, Pa. An interesting paragraph in the prospectus recently issued is the following: "Since fifty-eight per cent. of all industrial accidents are shown by statistics to be due to negligence, carelessness or lack of knowledge of employers or employees, the vital necessity of learning everything possible about the causes and means of preventing these accidents must be evident to every man concerned in mining. To the operators it spells business success or failure; to the miner, life or the physical ability to work and support a family."